

Monitoring, Assessment, and Performance Measures

Attachment 6 describes the performance measures that will be used to quantify and verify each of the four projects' performance. It includes a discussion of the monitoring system to be used to verify projects' performance with respect to the project benefits and objectives identified in the Pajaro River Watershed IRWM Implementation Proposal. Where the data will be collected and the types of analyses to be used is described for each project and a discussion of how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the Plan is also included. The Project Performance Measures Tables for each of the proposal's four projects are attached and serve as a preview of the information that would go into monitoring plans for the projects. The projects are presented in the following order:

1. Hollister Urban Area Water Project
2. Critical Water Supply System Improvements for Pajaro (DAC)
3. Increased Recycled Water Storage Project
4. Pajaro Agricultural Water Quality and Aquifer Enhancement Project

Project 1 Hollister Urban Area Water Project

Project Goals

The following are goals related to water resources for the Hollister Urban Area (HUA) Water Project:

- **Goal #1: Potable Water Quality Benefits:** Improve water quality for the existing municipal and industrial customers in the HUA, reducing TDS and hardness.
- **Goal #2: Effluent Water Quality Benefits:** Improve the quality of the wastewater effluent at the community's wastewater treatment plants in order to comply with the respective Waste Discharge Requirements to reduce salinity (measured as TDS) to less than 1,200 mg/L.
- **Goal #3: Water Supply Reliability Benefits:** Increase the surface water treatment capacity from 1,740 AFY to 7,280, allowing better utilization of the contracted CVP supply.
- **Goal #4: Water Supply Benefits:** Improve the beneficial use opportunities of 2,500 AFY of recycled water by improving the quality, measured as a reduction in TDS.

Monitoring Programs

Performance measures are used to evaluate and document success in achieving both project and regional water resources goals. These measures typically involve some form of monitoring. Existing monitoring programs include performance metrics that can be used to evaluate the success of the HUA Water Project with respect to achieving the goals listed above.

The City of Hollister's Master Reclamation Permit Requirements (Order No. R3-2008-0069) includes a requirement to implement a Long Term Salinity Management Program to document salt loading and evaluate and implement measures for the reduction of salt loading as result of the application of recycled water. As part of the Long Term Salinity Management Program, the City of Hollister must submit an annual report documenting salt loading and salt reduction efforts. This report includes an analysis of annual salt (TDS, sodium, chloride, sulfate, and boron) loading to the groundwater basin, particularly as a result of using recycled water. The report includes an analysis of the contributing sources of salt mass in the recycled water, including the salt concentration in potable water supply as well as contributions by water softeners.

In addition, the City of Hollister's Monitoring and Reporting Program Requirements (Order No. R3-2008-0069), issued by the Regional Water Quality Control Board – Central Coast Region pursuant to Water Code section 13267, requires that the City collect and analyze representative samples of water supplies impacting the City's wastewater treatment facilities. The analysis must be conducted at least once per year (in September) and must include a General Mineral analysis including Total Hardness, Total Dissolved Solids, Sodium, and Chloride, among others. The City must also collect and examine samples of the treatment facility influent including

quarterly analysis of Total Dissolved Solids, Sodium, and Chloride. Similar analyses must be conducted for the treatment facility effluent on a monthly basis. Finally, the City must also monitor the recycled water use area. The quantity of recycled water distributed to each reuse site must be recorded on a weekly basis and total flows must be metered.

Performance Measures

Performance measures will be used to quantify and verify the success of the HUA Water project in meeting goals. The following performance measures have been selected for each respective project goal:

Goal: Improve water quality for the existing municipal and industrial customers in the HUA, reducing TDS and hardness.

Performance Measure: The Long Term Salinity Management Program and water purveyor supply monitoring will provide multiple sites for documenting the anticipated reduction in both hardness and TDS in the potable water supply. This performance measure, therefore, will be a trend analysis of hardness and TDS concentrations in the potable water supply and will be a direct indicator of the achievement of this goal.

Goal: Improve the quality of the wastewater effluent at the community's wastewater treatment plants in order to comply with the respective Waste Discharge Requirements to reduce salinity (measured as TDS) to less than 1,200 mg/L.

Performance Measure: This goal will be achieved when the TDS in the wastewater effluent less than 1200 mg/L. This requirement is based on the Waste Discharge Requirements for the wastewater plants, respectively and each is required to measure and report to the Regional Water Quality Control Board monthly effluent TDS concentrations.

Goal: Increase the surface water treatment capacity from 1,740 AFY to 7,280, allowing better utilization of the contracted CVP supply.

Performance Measure: This goal will be achieved when San Benito County Water District's (SBCWD) historic use (per the USBR Shortage Policy) is equal to their contract entitlement, 8,250 AFY. Currently, the historic use is set at 5,556 AFY because SBCWD has not had a means by which to treat and beneficially use the water. The HUA Water Project, in addition to existing demands, will enable the SBCWD to make full use of the 8,250 acre fee in any year in which the allocation is set at 100%. This will result in an increase in the historic use. The water use is metered by SBCWD at the

point of delivery (the Bifurcation Structure at the upstream end of the Hollister Conduit) and reported directly to the USBR.

Goal: Improve the beneficial use opportunities of 2,500 AFY of recycled water by improving the quality, measured as a reduction in TDS.

Performance Measure: The Long Term Salinity Management Program requires that both the quality (TDS) of the recycled water and the quantity of recycled water be measured regularly. This goal will be achieved when recycled water can be used for beneficial uses, and specifically, when 2,500 AFY are put to beneficial use. This will be measured at meters at the point of delivery to recycled water customers.

Project Goals	Desired Outcomes	Performance Indicators	Targets	Measurement Tools and Methods
Goal #1: Potable Water Quality Benefits	Improve potable water quality	Concentration of hardness and TDS in the potable water supply	Average System Hardness: 150 mg/L TDS: 500 mg/L	Regular potable water samples and analysis of hardness and TDS
Goal #2: Effluent Water Quality Benefits	Improve wastewater effluent quality; meet requirements of WDRs	Concentration of TDS in the wastewater effluent	Less than 1200 mg/L TDS in the effluent	Regular effluent samples and analysis of TDS
Goal #3: Water Supply Reliability Benefits	Improve the reliability of imported CVP water	Increase historic use amount	8,250 AFY	Annual M&I CVP delivered to San Benito CWD (AFY)
Goal #4: Water Supply Benefits	Improve recycled water quality to improve opportunity for beneficial use	Volume of recycled water put to beneficial use	2,500 AFY	Metered volume of recycled water delivered to recycled water customers

Project 2 Critical Water Supply System Improvements for Pajaro (DAC)

The following goals related to water supply benefits that will be met entirely by implementation through grant funding for the Critical Water Supply System Improvements for Pajaro, a Disadvantaged Community (DAC):

- **Water Supply Benefits:** 600,000 gallons of critical water supply storage.
- **Community Benefits:** improved public health and safety.
- **Infrastructure Benefits:** improved water supply reliability, enhanced water system resilience and more robust infrastructure.

The primary benefit of the project is provision of 600,000 gallons of storage capacity to increase system storage capacity to a total of 1.2 million gallons, and thereby meet CDPH, water code, and fire code requirements for a public water supply system. No uncertainty exists regarding the provision of the new 600,000 gallons of storage. There is uncertainty regarding the rehabilitation of the existing 600,000 gallon tank because it will be deferred until additional funding can be secured.

Secondary benefits from the project include improved public health and safety, water supply reliability, enhanced water system resilience and more robust infrastructure. No uncertainty exists regarding these benefits.

Monitoring Programs

Data collection for this task is part of the existing data collection, management and reporting program already implemented to satisfy California Department of Public Health (CDPH) requirements for potable water supply systems. Additionally, CDPH inspects the system operated by the Pajaro Sunny Mesa Community Services District (PSMCSD) to verify the performance of the system is meeting the requirements.

Performance Measures

Performance measures will be used to quantify and verify the success of the project in meeting goals. The following performance measures have been selected for each respective project goal:

Goal: Provide 600,000 gallons of critical water supply storage.

Performance Measure: This goal is achieved upon project implementation by the construction of a 600,000 gallon welded steel water storage tank and piping associated with integrating the tank into the existing PSMCSD water supply system. The performance measure associated with this goal is the successful construction of the tank and connection to the PSMCSD system. PSMCSD will document the construction process.

Goal: Improve public health and safety.

Performance Measure: This goal is achieved upon completion of the project infrastructure, which provides the required storage to meet the minimum storage capacity for a water system and the minimum fire flow storage. The performance measure of the improved public health and safety will be the ability to meet maximum day demands and provide fire protection for Pajaro (DAC).

Goal: Improve water supply reliability, enhanced water system resilience and more robust infrastructure.

Performance Measure: This goal is achieved upon completion of the project infrastructure, which provides a new, reliable and robust storage tank to provide for water supply and fire flows. Addition of this second storage tank improves water supply reliability and system resilience. The performance measure of the enhanced system reliability and resilience will be the ability to meet maximum day demands and provide fire protection for Pajaro, with the additional capacity of the first tank.

Project Goals	Desired Outcomes	Performance Indicators	Targets	Measurement Tools and Methods
Water Supply Benefits from a new 600,000 gallon tank providing critical water supply storage	The addition of storage capacity in the Pajaro Community water supply system to meet peak demand and emergency condition requirements.	Documentation of construction of the new water storage tank in Pajaro.	Addition of 600,000 gallons of storage to the Pajaro community water supply system.	Project construction contract documents and inspections
Community Benefits from improved public health and safety.	The ability to meet peak flow and emergency supply requirements and better maintain the storage tank infrastructure.	Documentation of construction of the new water storage tank in Pajaro	Addition of 600,000 gallons of storage to the Pajaro community water supply system	Project construction contract documents and inspections
Infrastructure Benefits of improved supply reliability, system resilience and robust infrastructure	The addition of a new storage tank and additional water storage capacity to the Pajaro system	Documentation of construction of the new water storage tank in Pajaro.	Addition of a new storage tank to the Pajaro community water supply system	Project construction contract documents and inspections

Project 3 Increased Recycled Water Storage Project

The following goals related to water supply benefits that will be met entirely by implementation through grant funding for the Increased Recycled Water Storage Project:

Goal #1: Increased Delivery of 750 AFY of Recycled Water:

Additional storage at the Water Recycling Facility will allow for the production of recycled water during times when the distribution system demand is low, particularly during the night. Recycled water will be produced and stored short-term, until the demand water deliveries is adequate to distribute a blend recycled and other water sources.

The water recycling facility is equipped with flow meters, calibrated to measure volume, at key points along the treatment process. With the use of flow meters, the volume of recycled water produced can be calculated. Flow meters measure the flow in gallons per minute (gpm) of potable blend supply used to improve the quality of recycled water, and they measure the flow of water pumped into the Coastal Distribution System (CDS) for agricultural irrigation. Flow in gallons per minute multiplied by time results in the volume of water (Gals). The difference between volume of water pumped into the CDS and the volume of blend supply is the volume of recycled water.

In addition to calculating the volume of recycled water produced, the Pajaro Valley Water Management Agency (PVWMA) measures the volume of water used by delivered water customers throughout the CDS. Every turnout on the CDS is equipped with a meter and is read monthly and calibrated at regular maintenance intervals by staff. The metered turnouts allow staff to measure and bill for delivered water usage. Agency Operators measure the flow of each source of water provided to the CDS, and as such, the total volume of water produced by the turnouts can be used as a check against the meters at the water recycling facility.

Goal #2: Reduced Groundwater Production of an Equivalent 750 AFY:

The Delivered Water Zone (DWZ) represents an area of approximately 7,000 acres that is served by the Coastal Distribution System (CDS), which provides a blend of recycled water, water recovered from a Managed Aquifer Recharge and Recovery Project, and other blend supplies. Groundwater production facilities (wells) used for agricultural irrigation are metered within the PVWMA boundary, and have been since approximately 1994. A historical baseline groundwater production value exists. A reduction of 750 AF of pumped groundwater will be shown in the groundwater production data obtained from the meter reads, which take place on a quarterly basis.

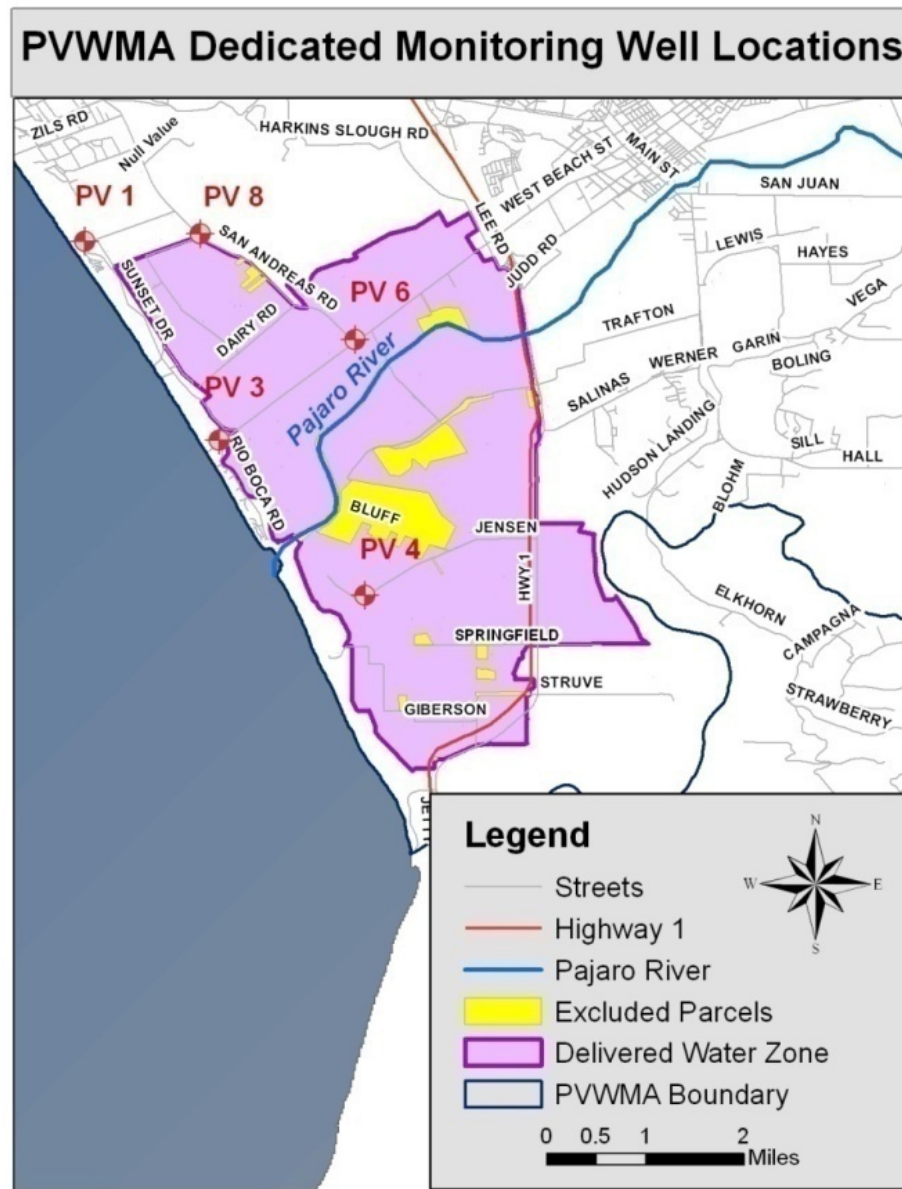
Statewide Monitoring Programs

California Statewide Groundwater Elevation Monitoring

In November 2009, California Legislature passed SBX7 6, which establishes collaboration between local monitoring parties and the California Department of Water Resources (DWR) to collect groundwater elevations statewide and that this information be made available to the public. In accordance with SBX7 6, the DWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program which establishes a permanent, locally-managed

system to monitor groundwater elevations in California's alluvial groundwater basins and subbasins identified in DWR Bulletin 118.

The Pajaro Valley Water Management Agency (PVWMA) participates in the CASGEM program by collecting water level data at the CASGEM dedicated monitoring sites within the Pajaro Valley and submitting those data to our local Monitoring Entity: the Santa Cruz County Environmental Health Department, Water Resources Division. The PVWMA's existing groundwater monitoring programs are compliant with CASGEM and serve as a valuable resource to the State and their related groundwater monitoring effort. The map and tables below show the location of the dedicated monitoring well network with respect to the DWZ, their construction information and the constituents analyzed following a sampling effort.



Constituent/Parameter	Units	Sample Type	Sampling Frequency
Depth to Water	Feet	Measured	Annually
Total Nitrogen (as N)	mg/L	Grab	Annually
Nitrate (as N)	mg/L	Grab	Annually
pH	Units	Grab	Annually
Total Dissolved Solids	mg/L	Grab	Annually
Sodium	mg/L	Grab	Annually
Chloride	mg/L	Grab	Annually
Sulfate	mg/L	Grab	Annually
Boron	mg/L	Grab	Annually

Well Name	Top of Well Casing Elevation (ft)	Total Depth (ft)	Screened Interval (ft)
PV1S	71.8	90	70 - 90
PV1M	71.7	230	140 - 230
PV1D	71.8	270	250 - 270
PV3S	6.9	170	140 - 170
PV3M	7.0	270	250 - 270
P 3D	6.9	480	380 - 480
PV4S	23.4	110	80 - 110
PV4MD	23.4	160	130 - 160
PV6S	9.5	180	110 - 180
PV6MS	9.5	280	260 - 280
PV6MD	9.4	650	510 - 650
PV6D	9.4	750	730 - 750
PV8S	118.1	200	130 - 200
PV8M	118.0	530	420 - 530
PV13	99.5	100	80 - 100

Groundwater Ambient Monitoring and Assessment (GAMA)

The PVWMA has offered to provide the dedicated monitoring wells included groundwater monitoring program described to the United States Geological Survey for inclusion in the Groundwater Ambient Monitoring and Assessment (GAMA) Program (requirements are detailed on the State Water Resources Control Board Water Quality Website (www.waterboards.ca.gov/gama)). Participation in the GAMA voluntary program ensures that groundwater quality information collected by the project proponents can be used to better understand and protect the state's groundwater resources.

Performance Measures

The following performance measures have been selected for each respective project goal:

Goal: Increased Delivery of 750 AFY of Recycled Water

Performance Measure: This goal is achieved by building additional storage as described in this proposal, producing and storing recycled water at night when delivered water demand is low and distributing it during the day when delivered water demand is high. Flow meters at the recycled water facility and on the turnouts will be used to measure the volume of recycled water produced and delivered.

Goal: Reduced Groundwater Production of an Equivalent 750 AFY

Performance Measure: This goal is achieved by delivering an additional 750 AFY of blended recycled water. Delivered water as an irrigation supply is a reliable and adequate replacement for groundwater based irrigation supply. Delivered water eliminates the need for an equivalent volume of pumped groundwater and serves as “in-lieu recharge” as described elsewhere in this proposal. Flow meters attached to discharge pipes on the production wells have been measuring groundwater production since about 1994 and will continue to do so in part to assess the success of this project. The reduction of groundwater production will be the measure of performance, with an anticipated reduction of 750 AFY following completion of the project.

Project Goals	Desired Outcomes	Performance Indicators	Targets	Measurement Tools and Methods
Increased Delivery of 750 AFF of Recycled Water	Increased Delivery of 750 AFF of Recycled Water	Metered volumes of recycled water produced	Delivery of an additional 750 AFY of recycled water	Flow meters, meter read database and billing system
Reduced Groundwater Production of an Equivalent 750 AFY	Decreased production of 750 AFY of Groundwater	Decrease the volume of groundwater extraction in DWZ by 750 AFY or more.	Decrease of the total volume of groundwater extraction in the DWZ by 750 AFY.	Flow meters, meter read database and billing system

Project 4 Pajaro Agricultural Water Quality and Aquifer Enhancement Project

The following goals related to water supply benefits that will be met entirely by implementation through grant funding for the Resource Conservation District of Santa Cruz County (RCDSCC) Pajaro Agricultural Water Quality and Aquifer Enhancement Project. The goals will be measured by the methods outlined below:

Goal 1: Support and expand efforts of the Community Water Dialogue to inform and lead grower-based efforts for irrigation and nutrient management

To meet this goal, the RCDSCC will work closely with the Community Water Dialogue (CWD) to:

- 1) Increase awareness and grower participation in CWD through outreach and facilitated working meetings and
- 2) Achieve water conservation savings of 60 AFY by engaging growers in programs (such as the Wireless Irrigation Network) to address water supply in the Pajaro River Watershed.
- 3) Measure project success by documenting and reporting:
 - a. Sign in sheets from twelve (12) CWD forums, and
 - b. Total annual water conservation savings of a minimum of 60 AFY from CWD programs.

Goal 2: Implement two (2) managed aquifer recharge projects in the Lower Pajaro

To meet this goal, the RCDSCC will implement two Managed Aquifer Recharge (MAR) basins in the Lower Pajaro River Watershed to achieve water conservation savings of a minimum of 200 AFY (after 2015). To measure project success, the RCDSCC will document and report the number of projects implemented and the estimated amount of total annual recharge per project. The RCDSCC will utilize the University of Santa Cruz, California (UCSC) Aquifer Recharge Initiative monitoring framework.

Goal 3: Develop and implement cost-share and performance-based incentives for water quality and water supply

To meet this goal, the RCDSCC will work closely with the Performance-based Incentives Program to:

- 1) Achieve water conservation savings of 50 AFY,
- 2) Achieve a water quality benefit by 1/3 of participating growers reducing their load reduction of nitrogen in stormwater by 10%,
- 3) Identify metrics, measurement tools, and incentive targets that are applicable to the Managed Aquifer Recharge and Regional Mobile Lab Programs, and
- 4) Measure project success by documenting and reporting:
 - a. Total annual water conservation savings of a minimum of 50 AFY from the Performance-based Incentives Program

- b. Percent decrease in load reduction of nitrogen in stormwater by participating growers, and
- c. Performance-based Incentive framework applicable to MAR and the MIL Programs. The RCDSACC will utilize the Performance-based Incentives monitoring framework to verify project performance.

Goal 4: Provide a Regional Mobile Lab to provide technical and outreach services to promote improved irrigation efficiency

To meet this goal, the RCDSACC will work closely with the Central Coast Agricultural Water Quality Coalition to:

- 1) Provide education and training for irrigators and ranch managers in the Pajaro River Watershed,
- 2) Achieve water conservation savings of 90 AFY by engaging a minimum of ten (10) growers per year to realize a 10% improvement in their water use, and
- 3) Measure project success by documenting and reporting:
 - a. Number of growers per year receiving technical assistance and
 - b. Total annual water conservation savings of a minimum of 90 AFY.
 - c. The RCDSACC will utilize the following models to verify project performance: EPA Region 5 Model, Nitrogen Index Model, DeNitrification-DeComposition (DNDC) Model, UCCE Crop Manage Tool, Agricultural Research Service (ARS) Model and the Water Quality Index (WQI) Model and/or another project appropriate identified model.

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Pajaro Agricultural Water Quality and Aquifer Enhancement Project					
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Community Water Dialogue					
1: Support and expand efforts of the community water dialog to inform and lead grower-based efforts for irrigation and nutrient management.	1. Increase awareness and grower participation in the community water dialogue through outreach and facilitated working meetings with growers and property owners to discuss overdraft solutions. 2. Achieve water conservation savings of 60 acre feet per year by engaging growers in community water dialogue related programs (such as the Wireless Irrigation Network) to address water supply in the Pajaro Watershed.	1. Increased participating in community water dialogue to inform and lead grower-based efforts for irrigation and nutrient management. 2. Annual water conservation savings from community water dialogue programs.	1. Forums with growers and property owners to discuss overdraft solutions. 2. Total annual water conservation savings (in acre feet).	1. Sign in sheets from community water dialogue forums. 2. Surveys to gage the extent to which Community Water Dialogue Programs have led to water conservation benefits.	1. Twelve (12) forums with growers 2. Annual water conservation savings of 60 acre feet per year.
Managed aquifer recharge (Lower Pajaro)					
2. Implement two (2) managed aquifer recharge projects in the Lower Pajaro.	Achieve water conservation savings of 200 acre feet per year (after 2015) from the implementation of two (2) managed aquifer recharge basins.	Annual water conservation savings from implemented managed aquifer recharge basins.	Total annual water conservation savings (in acre feet).	Documented annual water conservation savings.	Annual water conservation savings of 200 acre feet per year (after 2015).
Cost-share and Performance-based Incentives					
3. Develop and implement cost-share and performance-based incentives for water quality and water supply	1. Achieve water conservation savings of 50 acre feet per year by working with a minimum of sixteen (16) participating ranches per year. 2. Achieve a water quality benefit by 1/3 of participating growers reducing their load reduction of nitrogen in stormwater by 10%. 3. Identify metrics, measurement tools, and incentive targets for Managed Aquifer Recharge and Regional Mobile Lab Programs.	1. Annual water conservation savings from growers receiving cost-share assistance. 2. Decrease in load reduction of nitrogen in stormwater of participating growers 3. Metrics, measurement tools, and incentive targets for Managed Aquifer Recharge and Regional Mobile Lab Programs.	1. Total annual water conservation savings (in acre feet). 2. Percent decrease in load reduction of nitrogen in stormwater. 3. Identified metrics, measurement tools, and incentive targets for Managed Aquifer Recharge and Regional Mobile Lab Programs.	1. Documented annual water conservation savings. 2. Documented percent decrease in load reduction of nitrogen in stormwater by participating growers. 3. Documented metrics, measurement tools, and incentive targets for Managed Aquifer Recharge and Regional Mobile Lab Programs.	1. Annual water conservation savings of 50 acre feet per year. 2. 10% load reduction of nitrogen in stormwater by of 1/3 of participating growers. 3. Identified metrics, measurement tools, and incentive targets for Managed Aquifer Recharge and Regional Mobile Lab Programs.
Mobile Irrigation Lab					
4. Provide a Regional Mobile Lab to provide technical and outreach services to promote improved irrigation efficiency	1. Provide education and training for irrigators and ranch managers in the Pajaro Watershed. 2. Achieve water conservation savings of 90 acre feet per year by engaging a minimum of ten (10) growers per year to realize a 10% improvement in their water use.	1. Participation in the Mobile Irrigation Lab. 2. Annual water conservation savings from the Mobile Irrigation Lab.	1. Number of growers receiving training and cost-share assistance from Mobile Irrigation Lab. 2. Total annual water conservation savings (in acre feet).	1. Documented number of growers 2. Documented annual water conservation savings.	1. Provide ten (10) growers per year with technical assistance. 2. Annual water conservation savings of 90 acre feet per year.